

REMARKS

This application was filed with Claims 1 – 25 and with drawings of figures 1 – 32. Claims 1 – 25 have been rejected. Claims 2 and 14 have been canceled. Claims 1, 3, 5, 12, 15, 17 and 24 have been amended. Therefore, Claims 1, 3 – 13, and 15 – 25 are pending in the Application. Figures 5, 11, 14, 15, 22, 24, and 27 have been amended. Reconsideration of the application based on the remaining claims as amended and arguments submitted below is respectfully requested.

Drawings

The Examiner has asserted that drawings of Figures 5, 11 – 14, 15, 22, 24, 27 and 37 are prior art. In order to advance the prosecution, the Applicant submits replacement drawings as regards Figures 5, 11, 14, 22, 24, and 27. Applicant notes that only 32 figures were submitted and request clarification of what figure is referenced by the Examiner's citing of drawing of Figure 37.

As regards the drawings of Figures 12, 13 and 15, the Applicant disagrees with the Examiner and traverses the objection. Figure 12 shows a portion of a description of a hardware-in-the-loop simulation. Figures 13 and 15 both show continuous process simulation. These features are unique to the present invention in describing real-time, hardware-in-the-loop simulations. Thus, Figures 12, 13 and 15 are not prior art drawings.

Claim Rejections - 35 U.S.C. § 103

Claims 1 – 25 have been rejected under 35 U.S.C. § 103 based on Wells et al. "Parallel Simulation of a Large-Scale Aerospace System Multicomputer Environment" (1997) in view of DOME Guide (Honeywell 1998). The Office Action asserts that Wells teaches parallel simulation of hardware platforms, the Applicant disagrees and cites the Declaration of the Inventor for expert opinion as to the teachings of the prior art and for comments regarding the novel aspects of the present invention. Wells does not teach software and hardware-in-the-loop simulations, but only teaches large scale simulations of software systems. The firmware term taught in Wells refers to embedded software not hardware. DOME is a drawing tool.

I. Substantive Shortcomings of the Rejection

- (1) Combined prior art fails to teach or suggest all claim limitations.

MPEP § 2142 states that "[t]o establish a prima facie case of obviousness ...the prior art reference[s] must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art," citing *In re Vaech*, 947, F.2d 488, 20 USPQ 1438 (Fed. Cir. 1991).

The Office Action asserts that the limitation of "processes and real system hardware" recited in each independent Claims 1, 12 and 24 is disclosed by Wells and DOME (Office Action, page 4, 9 and 13, respectively). Applicant respectfully disagrees. DOME recites "real-time architecture specifications." Wells recites an "evaluat[ion] ...[of] software and firmware ...execute[d] in real time" and

“simulation of [] physical components.” Firmware is not hardware, but only embedded software. Further, there is no teaching that the simulation of physical components models hardware-in-the-loop. Claims 1, 12 and 24 (as original) and now independent Claims 5 and 17 (as currently amended) each recite a limitation of “processes and real system hardware.” Thus, Wells and DOME fail to teach or suggest this limitation of “processes and real system hardware.”

Claims 1, 12 and 24 have each been amended to recite a limitation of a “set of node elements includ[ing] ...continuous processes.” The Office Action asserts that this limitation is disclosed by Wells (Office Action, page 5, 9 and 13, respectively). Applicant respectfully disagrees. The Office Action references Wells pg 514, but Wells makes no reference to a continuous process. Thus, Wells and DOME fail to teach or suggest this limitation of a “set of node elements includ[ing] ...continuous processes.”

Claims 5 and 17 each recite a limitation of a “synchronization with data transfer between processes” and have been amended to place them in independent form. Independent Claim 24 has been amended to recite a limitation of a “synchronization with data transfer between processes.” The Office Action asserts that this limitation is disclosed by Wells (Office Action, page 6 and 11). Applicant respectfully disagrees. The Office Action references Wells pg 514, but Wells makes no reference to a synchronization with data transfer between processes. Thus, Wells and DOME fail to teach or suggest this limitation of a “synchronization with data transfer between processes.”

Claims 7 and 19 each recite a limitation of “a synchronization mechanism includ[ing] a sync release time relative to an execution time of the source process and a sync frequency.” The Office Action asserts that this limitation is disclosed by Wells (Office Action, page 7 and 11). Applicant respectfully disagrees. The Office Action references Wells pg 512 and 518. But, Wells makes no reference to pre-defined timing relationships. Wells references: (1) weighting expected execution time of tasks as a method of bounding obtainable speedup of processing (pg 512); and (2) total execution time for a simulation (pg 518). Thus, Wells and DOME fail to teach or suggest this limitation of “a synchronization mechanism includ[ing] a sync release time relative to an execution time of the source process and a sync frequency.”

Thus, Wells and DOME fail to teach or suggest a total of two limitations taught in each of the currently amended independent Claims 1, 5, 12, 17 and 24. Additionally, Wells and DOME fail to teach or suggest a limitations taught in each of the currently amended dependent Claims 7 and 19. Applicant respectfully submits that the cited references fail to factually support a *prima facie* conclusion of obviousness as regards Claims 1, 5, 12, 17 and 24. Applicant respectfully requests that the rejection of Claims 1, 5, 12, 17 and 24 under § 103 be withdrawn. Since all other pending claims depend from one of the above allowable independent claims, Applicant respectfully submits that the cited references fail to factually support a *prima facie* conclusion of obviousness as regards Claims 3, 4, 6 – 11, 13, 16, 18 – 23 and 25. For this reason, Applicant respectfully requests that the rejection of Claims 1, 3 – 13, and 15 – 25 under § 103 be withdrawn.

II. Extrinsic Evidence Rebutts the Prima Facie Conclusion of Obviousness

(1) Invention meets a long felt but heretofore unresolved need in the industry and has solved a problem encountered by those skilled in the art.

MPEP § 2141 states that “[o]bjective evidence or secondary considerations such as ... long-felt need, failure of others [to solve a problem encountered by those skilled in the art]... are relevant to the issue of obviousness and must be considered in every case in which they are present.” citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713, F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983). MPEP § 716 states that “[a]ffidavits or declarations, when timely presented, containing evidence of... long-felt but unsolved needs ...must be considered by the examiner in determining the issue of obviousness of claims for patentability under 35 U.S.C. § 103.”

Affidavit evidence submitted with this Response shows the subject matter of each of the claims in the present Application has met long felt but heretofore unresolved need and has solved a problem encountered by those skilled in the art of software simulation: the problem of designing and specifying real-time, hardware-in-the-loop simulations.

Applicant respectfully submits that the *prima facie* conclusion of obviousness as regards Claims 1, 3 – 13, and 15 – 25, as previously amended and as currently amended, under 35 U.S.C. §103 is rebutted by the enclosed Affidavit showing evidence of a long felt, but previously unmet need. For this reason, Applicant respectfully requests that the rejection of Claims 1, 3 – 13, and 15 – 25 under § 103 be withdrawn.

Conclusion

For each and every of the foregoing reasons, Applicant assert that the rejection of Claims 1, 3 - 13, and 15 - 25 under 35 U.S.C. § 103(a) should be withdrawn. Applicant respectfully further submits that Claims 1, 3 - 13, and 15 - 25, as amended, are in condition for allowance.

Applicant has commented on some of the distinctions between the cited references and the claims to facilitate a better understanding of the present invention. This discussion is not exhaustive of the facets of the invention, and Applicant hereby reserves the right to present additional distinctions as appropriate. Furthermore, while these remarks may employ shortened, more specific, or variant descriptions of some of the claim language, Applicant respectfully notes that these remarks are not to be used to create implied limitations in the claims and only the actual wording of the claims should be considered against these references.

Respectfully submitted,



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